

**SELF-CONTAINED ILLUMINATION DEVICE FOR MEDICINE CONTAINERS**

**CROSS REFERENCES TO RELATED APPLICATIONS**

Not applicable.

**BACKGROUND — FIELD OF INVENTION**

The present invention relates to a self-contained illumination device for containers and more particularly pertains to permitting illumination of difficult-to-read medication labels in low-light environments with an illumination device for medicine containers.

**BACKGROUND — STATE OF THE ART**

There are many occasions when an individual must wake from sleep, arise and take medications during the nighttime hours, when light levels are low. Medications, such as pain medicine, sleeping pills, antacids, migraine medicine, and medication that must be taken on timed schedules (e.g., four times per 24-hour period), among others, are often taken in the nighttime hours. Often, the individual requiring the medication has been asleep and thus is groggy and sometimes disoriented. The medication is generally contained in a medicine cabinet and/or a drawer in the bathroom, or in a

1 drawer near the individual's bed, along with many other  
2 medications (which are increasing every year as many new drugs  
3 become available, and as the population of the elderly  
4 increases). When combined, the above conditions, e.g., low  
5 light and/or no light, multiple medications in one location,  
6 pain and sleepiness, can increase the chances that the  
7 individual will take the wrong medicine or dosage.

8

9       One method for decreasing the chance of taking the wrong  
10 medicine is to provide light so that the individual can  
11 accurately read the medicine container label. The most often  
12 used method for achieving this is by turning on a light within  
13 the room (e.g., an overhead light in the bathroom or a desk  
14 lamp near the bed). This method has the disadvantage of  
15 causing further pain and disorientation, as the individual's  
16 pupils are most likely dilated due to the low-light level  
17 conditions and the sleep state. This method also has the  
18 undesirable affect of disrupting the sleep pattern of the  
19 individual, by bringing him closer to the state of awakeness,  
20 thus possibly further complicating the condition requiring the  
21 medication. Another less-used method for providing light is  
22 to use some type of hand-held light, such as a flashlight or  
23 book-reading light, to illuminate the medicine container. Due

1 to the direct, bright light of these devices, this method has  
2 similar problems as turning on a light, as discussed above.  
3 Additionally, this method is more difficult for the sleepy,  
4 groggy individual, as it requires two hands to examine the  
5 medicine container label and to open the container and  
6 retrieve the medicine. Further, flashlights and book-reading  
7 lights are often misplaced, have run-down batteries, and may  
8 not be in the correct location when needed. Finally, a  
9 nightlight may be used, but often these are not even  
10 available, or are situated away from the medicine container  
11 location (e.g., usually in an electrical outlet near the floor  
12 and/or near the toilet) and thus the patient must carry many  
13 medicine containers to the nightlight in order to retrieve the  
14 correct medicine. Again, this method is more difficult for the  
15 sleepy, groggy individual and offers the further danger of the  
16 individual falling and/or colliding with something in the  
17 pathway to the nightlight.

18  
19 While these methods fulfill the objective of aiding the  
20 individual in retrieving the correct medication, it is obvious  
21 that they can exacerbate the original problem that caused the  
22 need for medication, or even cause further problems.

1       Therefore, from the above, it can be appreciated that  
2       there is a pressing and increasing need for a means to provide  
3       better illumination of medicine containers.

4  
5       **SUMMARY OF THE INVENTION**

6       The present invention is directed to improved containers  
7       for medicines, and in particular to improved illumination of  
8       medicine container labels to aid the individual in retrieving  
9       the correct medication in low-light level environments.

10  
11       **Objects and Advantages**

12       It is therefore an object of the invention to provide an  
13       illumination device for medicine containers, which prevents  
14       the possibility of an individual taking the wrong medication  
15       due to low-level lighting conditions.

16  
17       It is another object of the invention to provide an  
18       illumination device for medicine containers, which illuminates  
19       the medicine container label in such a way, that the  
20       individual's eyes receive a minimum amount of direct light.

21  
22       It is a further object of the invention to provide an  
23       illumination device for medicine containers, which illuminates

1 the medicine container label with a wavelength (color) and  
2 level of light intensity that does not cause the individual  
3 discomfort due to dilated pupils.

4

5 It is also an object of the invention to provide an  
6 illumination device for medicine containers, which may be  
7 easily and efficiently manufactured and marketed.

8

9 It is an additional object of the invention to provide an  
10 illumination device for medicine containers, which is of  
11 durable and reliable construction.

12

13 It is yet another object of the invention to provide an  
14 illumination device for medicine containers, which is  
15 waterproof.

16

17 It is yet a further object of the invention to provide an  
18 illumination device for medicine containers, which couples to  
19 a wide variety of types of medicine containers and/or medicine  
20 container caps used in the medical area.

21

22 It is yet an additional object of the invention to provide  
23 an illumination device for medicine containers, which is

1 adapted to a low cost of manufacture with regard to both  
2 materials and labor, thereby making the invention disposable  
3 or reusable, and which accordingly is then adapted for sale at  
4 low prices to the consuming public, thereby making such an  
5 illumination device for medicine containers economically  
6 available to the buying public.

7

8 In accord with these objects, which will be discussed in  
9 detail below, a self-contained illumination device for  
10 medicine containers is provided. The illumination device  
11 includes a light source component for illumination, a switch  
12 component to control the light source, supporting circuitry  
13 components to energize the light source, and a housing  
14 structure for: supporting and enclosing the components;  
15 directing the illumination to the label; and coupling the  
16 illumination device to a medicine container and/or a  
17 conventional medicine container cap. In a preferred  
18 embodiment, a light emitting diode (LED), emitting a bluish  
19 color, provides the illumination. An electrical switch is  
20 provided to connect an energy source to the LED thus turning  
21 it "ON." The light generated by the energized LED is further  
22 directed through a circular light-pipe channel within the  
23 device, which then directs it toward the label, thereby

1 illuminating the label in a 360-degree field. Supporting  
2 circuitry includes a battery with an electrical current-  
3 limiting potentiometer mounted on a printed circuit board  
4 (PCB). The housing structure is a molded plastic material  
5 containing a flexible material positioned directly over the  
6 switch, which allows the individual to activate the switch  
7 while also providing protection of internal components from  
8 the outside environment, e.g., a waterproof seal.  
9 Additionally, the housing structure provides the light-pipe  
10 channel; encapsulates the above components; and is designed to  
11 couple to a medicine container receptacle and/or a  
12 conventional medicine container cap.

13

14       The resultant self-contained illumination device for  
15 medicine containers is adapted for excellent illumination of  
16 medicine container labels in low-light level environments. An  
17 illumination device for medicine containers has application in  
18 the medical arts in the home environment for both humans and  
19 pets, unfamiliar locations (e.g., hotel rooms while traveling,  
20 camping, etc.), the clinical environment (hospitals and long-  
21 term care facilities), and in the pharmaceutical environment  
22 (pharmacies and/or pharmaceutical production laboratories); in  
23 the use of chemical handling in low-light level conditions,

1 such as in chemical laboratories and/or photography  
2 laboratories; and in the general home environment, for  
3 example, with spice containers, jars or household cleaners, in  
4 non-lighted cabinets or at night; among other fields.

5  
6 There has been outlined, rather broadly, features of the  
7 invention in order that the detailed description thereof that  
8 follows may be better understood, and in order that the  
9 present contribution to the art may be better appreciated.  
10 There are, of course, additional features of the invention  
11 that will be described hereinafter and which will form the  
12 subject matter of the claims appended hereto.

13  
14 In this respect, before explaining at least one embodiment  
15 of the invention in detail, it is to be understood that the  
16 invention is not limited in its application to the details of  
17 construction and to the arrangements of the components set  
18 forth in the following description or illustrated in the  
19 drawings. The invention is capable of other embodiments and  
20 of being practiced and carried out in various ways. Also, it  
21 is to be understood that the phraseology and terminology  
22 employed herein are for the purpose of description and should



1 not be regarded as limiting.

2

3 **BRIEF DESCRIPTION OF THE DRAWINGS**

4

5 Fig. 1 is a perspective view of the preferred embodiment of  
6 a medicine container with a container cap that illuminates a  
7 container label with light in a continuous 360-degree range;

8

9 Fig. 2 is a cross-sectional profile through the medicine  
10 container and container cap, taken on line 1-1 in Fig. 1,  
11 describing a side view of the functional components contained  
12 within the container cap;

13

14 Fig. 3 is a perspective view of a container cap insert  
15 cover, which retains a flexible membrane;

16

17 Fig. 4 is a circuit schematic of the preferred embodiment;

18

19 Fig. 5 is a cross-sectional profile of the flexible  
20 membrane.

21

22 Fig. 6 is a perspective view of a cylindrical adaptor used  
23 to connect the flexible membrane to an electrical switch.

1

2        Fig. 7 is a top plan view of the container cap of Fig. 1  
3        showing the flexible membrane material and the container cap  
4        insert cover;

5

6        Fig. 8 is a top view of the functional components contained  
7        within the container cap of Fig. 2 with the container cap  
8        insert cover removed;

9

10       Fig. 9 is a bottom plan view of the container cap of Fig. 1  
11       showing an annular output opening and functional components  
12       contained within the container cap;

13

14       Fig. 10 is a perspective view of a second embodiment of a  
15       medicine container with a container cap that illuminates the  
16       container label with visible light in a continuous 360-degree  
17       range using multiple LEDs;

18

19       Fig. 11 is a cross-sectional profile through the medicine  
20       container and container cap, taken on line 3-3 in Fig. 10,  
21       describing a side view of the functional components contained  
22       within the container cap;

23

1      Fig. 12 is a top plan view of the container cap of Fig. 10  
 2      showing the flexible membrane material and the container cap  
 3      insert cover;

4  
 5      Fig. 13 is a top view of the functional components contained  
 6      within the container cap of Figure 10 with the container cap  
 7      insert cover removed;

8  
 9      Fig. 14 is a bottom plan view of the container cap of Fig.  
 10     10 showing four LEDs used for illumination;

11  
 12     Fig. 15 is a circuit schematic of the second embodiment;

13  
 14     Fig. 16 is a perspective view of a third embodiment of a  
 15     medicine container with a container cap describing a flexible  
 16     membrane material covering a side-mounted switch;

17  
 18     Fig. 17 is a perspective view of a fourth embodiment of a  
 19     medicine container with a container cap describing a flexible  
 20     container cap insert cover;

21.

1        Fig. 18 is a block diagram of a fifth embodiment describing  
2        an additional circuit to control the LEDs used for  
3        illumination;

4  
5        Fig. 19 is a block diagram of a sixth embodiment describing  
6        another circuit to control the LEDs used for illumination;

7  
8        Fig. 20 is a block diagram of a seventh embodiment  
9        describing the combination of the circuitry shown in Figs. 18  
10       and 19 used to control the LEDs used for illumination;

11  
12       Fig. 21 is a side elevation view of an eighth embodiment of  
13       a medicine container with a container cap that is removably  
14       coupled to a conventional container cap and medicine container  
15       therewith;

16  
17       Fig. 22 is an exploded, side elevation view of the  
18       embodiment shown in Fig. 21 describing the physical  
19       relationship between the container cap and the conventional  
20       container cap, and medicine container therewith, in the  
21       decoupled state;

1        Fig. 23 is a perspective view of a ninth embodiment of a  
2        medicine container with a container illumination base that is  
3        removably coupled to the medicine container therewith;

4

5        Fig. 24A is a top plan view of the container illumination  
6        base shown in Fig. 23;

7

8        Fig. 24B is a cross-sectional profile through the medicine  
9        container and container illumination base, taken on line 5-5  
10       in Fig. 24A;

11

12       Fig. 25 is a perspective view of a tenth embodiment of a  
13       medicine container with an enclosing container illumination  
14       lightpipe that is removably coupled to the medicine container  
15       therewith; and

16

17       Fig. 26 is a cross-sectional profile through the medicine  
18       container and enclosing container illumination lightpipe,  
19       taken on line 7-7 in Fig. 25, describing a side view of the  
20       light source beam paths.

21

22

23

## 1 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

2

3 With reference now to the drawings, FIGS. 1 through 9  
4 illustrate a medicine container, generally 20, embodying a  
5 container cap, generally 22, and a container label 32 attached  
6 to a container receptacle 28 of the present invention.

7 Container receptacle 28 includes a wall 25 with an outer  
8 surface 26. Label 32 attaches to outer surface 26 and includes  
9 a set of instructional text 34, or other indicia, which lists  
10 information about the patient and a medicinal product 30  
11 contained in the container receptacle 28, including product  
12 name, dosage instructions, expiration date, refill  
13 information, and/or other medicinal product information. This  
14 set of instructional text 34, and identification of the  
15 medicinal product 30, is the critical information the patient  
16 must read and recognize, respectively, in the low-light level  
17 environment. Additionally, label 32 may also be in the form of  
18 a small, peel-back instructional booklet, usually with very  
19 small print, which contains additional information regarding  
20 the medicinal product 30. Other types of container labels 32  
21 may exist as well and be illuminated by a plurality of light  
22 beams, generally 36.

23

1        Container cap **22** is comprised of an inner annular support  
2        structure **74** having a central opening **75** into which is placed  
3        a printed circuit board **60**. Thus, printed circuit board **60** is  
4        contained within container cap **22** and is preferably positioned  
5        perpendicular to the longitudinal axis of the attached  
6        container receptacle **28**. Printed circuit board **60** is secured  
7        in central opening **75** to inner annular support structure **74**  
8        preferably by an adhesive **61**, such as AS-124M removable  
9        adhesive, available from Adhesives Research, Inc., although  
10       other securing methods may be used (e.g., bonding agents or  
11       mechanical fasteners). An outer annular support rim **70**  
12       contains an aperture ledge **71**, which accepts a container cap  
13       insert cover **24**. Container cap insert cover **24** is connected to  
14       outer annular support rim **70** at aperture ledge **71** by a  
15       frictional fit or by an adhesive, e.g., silicone rubber or AS-  
16       124M removable adhesive, available from Adhesives Research,  
17       Inc. Outer annular support rim **70** fits onto inner annular  
18       support structure **74** at an annular snap junction **82** to form a  
19       physical connection between the two (or outer annular support  
20       rim **70** can be attached to inner annular support structure **74**  
21       by an adhesive, such as silicone rubber). A plurality of anti-  
22       rotation pins **78** engage a plurality of anti-rotation pin

1 apertures 79, located in outer annular support rim 70, to keep  
2 outer annular support rim 70 from rotating as container cap 22  
3 is tightened or removed. Inner annular support structure 74 is  
4 preferably fabricated by molding a clear or transparent  
5 plastic material, such as Acrylic or Lexan. Outer annular  
6 support rim 70 is preferably fabricated by molding an opaque  
7 plastic material, such as colored Acrylic or colored Lexan, or  
8 a moldable rubber material which provides additional gripping  
9 friction, such as GE Silicones liquid injection moldable  
10 rubber, LSR2005 elastomer. Additionally, inner annular support  
11 structure 74 and outer annular support rim 70 can be machined  
12 from plastic stock (e.g., cast Acrylic rod).

13

14 As seen in FIG. 3, container cap insert cover 24 is formed  
15 with an insert aperture 42 which accepts a flexible membrane  
16 46, preferably constructed from some type of rubber, e.g.,  
17 silicone rubber, although any flexible material may be used.  
18 As seen in FIG. 5, flexible membrane 46 has a circumferential  
19 groove 54 with a tapered neck 38 just below groove 54. When  
20 the flexible membrane 46 is inserted into container cap insert  
21 cover 24 with the tapered neck 38 projecting downwardly  
22 through insert aperture 42, circumferential groove 54 engages  
23 insert aperture 42. Additionally, flexible membrane lip,



1 generally 44, seats against an insert ledge 50, which is  
2 countersunk in container cap insert cover 24, thus forming a  
3 smooth top surface for container cap 22, that is, flexible  
4 membrane 46 does not protrude above container cap 22. Flexible  
5 membrane 46 forms an environmentally protective barrier, e.g.,  
6 waterproof, as well as making physical contact with an  
7 electrical switch 52, e.g., a single-pole, single throw  
8 Panasonic EVQ-PLDA15, through a cylindrical adaptor 80,  
9 containing a top surface 86, which contacts flexible membrane  
10 46, and a bottom surface 90, which contacts electrical switch  
11 52 (FIG. 6). Cylindrical adaptor 80 is preferably manufactured  
12 from a clear Acrylic plastic, although different colored  
13 material may be used to change the final illumination color  
14 (discussed in more detail below). Container cap 22 also  
15 contains structure to produce a light pipe channel 72, which  
16 is annular in shape in the preferred embodiment. The light  
17 pipe channel 72 has a lightwave entry end 67 and a lightwave  
18 exit end 68. A lightwave 76, generated by an illumination  
19 source 40, e.g., a wide-angle, blue light emitting diode, such  
20 as a Lumex SSL-LX3044USBD, enters lightwave entry end 67 in a  
21 360-degree direction (see FIGS. 2 and 8). Optionally, other  
22 LEDs, emitting other wavelengths (colors), or incandescent

1 bulbs, such as a Copeland retinoscope lamp bulb, may be used  
2 to generate lightwave 76. Once inside light pipe channel 72,  
3 lightwave 76 travels to lightwave exit end 68 and is emitted  
4 in a 360-degree direction.

5

6       Additionally, the outer surface, generally 84, of the  
7 inner annular support structure 74 may be coated with a  
8 reflective coating, such as gold, silver or aluminum, or with  
9 multi-layer dielectric mirror coatings, to increase the  
10 internal reflection of lightwave 76 toward lightwave exit end  
11 68. Alternatively, the inner surface, generally 85, of the  
12 outer annular support rim 70 may be coated with a reflective  
13 coating, such as gold, silver or aluminum, or with multi-layer  
14 dielectric mirror coatings, to increase the internal  
15 reflection of lightwave 76 toward lightwave exit end 68.  
16 Lightwave exit end 68 is formed at a slight angle, e.g.,  
17 80-degrees from the longitudinal axis of attached container  
18 receptacle 28, thus directing the light beams 36 more directly  
19 onto label 32. Alternatively, lightwave exit end 68 can be  
20 formed with no angle, e.g., 90-degrees to the longitudinal  
21 axis of attached container receptacle 28, while still  
22 providing adequate illumination of label 32.

1

2       Lightwave 76 emerges from lightwave exit end 68 through an  
3 annular filter cover 62 to produce plurality of light beams  
4 36, generally at annular output opening 63. Annular filter  
5 cover 62 may be clear, or may be manufactured with different  
6 colors depending on the color of the LED used. For example,  
7 annular filter cover 62 could be tinted, or constructed from a  
8 blue-colored material, such as an optical thermocast plastic  
9 color filter, available from Fosta-Tek Optics, or a Kodak  
10 Wratten filter (e.g., a Kodak 38A), and when used with a white  
11 LED, a blue illumination is produced at label 32. There are a  
12 wide variety of LED/filter combinations that can be used to  
13 create many illumination colors. Annular filter cover 62 may  
14 also be constructed to simultaneously diffuse lightwave 76.  
15 Additionally, as briefly discussed above, cylindrical adaptor  
16 80 may be machined, or thermocasted, from a colored plastic  
17 material (available from Fosta-Tek Optics), and thus when used  
18 with a white LED, various illumination colors may be  
19 generated. Further, colored LED lens covers, e.g., a Chicago  
20 Miniature Lamp 434-6, can be used, which snap directly onto  
21 the LED itself, thus offering yet another method for achieving  
22 various illumination colors. Thus, there are a number of  
23 possibilities for creating various illumination colors.

1

2 Inner annular support structure 74 has a set of internal  
3 threads 64 for attachment to a set of external threads 66 in  
4 attached container receptacle 28.

5

6 Printed circuit board 60 contains an energy source 56,  
7 e.g., a silver oxide button-cell, such as a Duracell D361,  
8 which may be attached directly to printed circuit board 60, or  
9 may be inserted in an energy source holder 57, e.g., a  
10 Keystone model 500, thus making it replaceable, an electrical  
11 current-limiting device 48, e.g., a Bourns Series 3309P  
12 potentiometer, the illumination source 40, and the electrical  
13 switch 52, all connected by PCB circuit traces in order to  
14 implement the closed circuit shown in FIG. 4. These circuit  
15 components can be inserted on printed circuit board 60 in an  
16 automated fashion (automatic insertion manufacturing typical  
17 to the electronics industry) or by manual methods.  
18 Alternatively, the closed circuit can be implemented by  
19 soldering the components together directly, without the use of  
20 the printed circuit board 60, and subsequently securing, and  
21 containing, the components in central opening 75 by an  
22 encapsulating potting compound, e.g., EPOCAP 14530A/2404B,  
23 available from Sanford Distributing Co., or a flexible

1 adhesive, such as silicone rubber, e.g., Silastic® silicone  
2 rubber, available from Dow Corning.

3

4 In reading container label 32 and inspecting medicinal  
5 product 30 contained within container receptacle 28, in  
6 accordance with the present invention using container cap 22  
7 illustrated in FIGS. 1 through 9, the individual initially  
8 retrieves medicine container 20 from the appropriate location  
9 (medicine cabinet, medicine drawer, bedside drawer, etc.).  
10 Once in hand, the individual holds medicine container 20 in  
11 such a way that at least one digit of his hand, preferably his  
12 forefinger, rests on flexible membrane 46. While reading  
13 container label 32, the individual presses flexible membrane  
14 46 thus contacting cylindrical adaptor 80, which in turn  
15 contacts electrical switch 52. As switch 52 closes, an  
16 electrical current 58 flows from energy source 56 through  
17 electrical current-limiting device 48, and illumination source  
18 40, and eventually back to energy source 56. As electrical  
19 current 58 flows through illumination source 40, illumination  
20 source 40 is energized and lightwave 76 is emitted. Electrical  
21 current-limiting device 48 can be adjusted to vary the  
22 intensity of lightwave 76. Since illumination source 40 is a

1 wide-angle LED, light will emerge in a 360-degree, radial  
2 direction toward the lightwave entry end 67 and into light  
3 pipe channel 72. Lightwave 76 is directed by light pipe  
4 channel 72 through container cap 22 toward lightwave exit end  
5 68. Lightwave 76 then travels through annular filter cover 62  
6 to become light beams 36, which in turn illuminate container  
7 label 32. The individual may then read container label 32.  
8 On some medicine containers 20, there is also instructional  
9 text on the back of the container. For this case, the  
10 individual simply rotates medicine container 20 and performs  
11 the preferably identical procedure described above.  
12 Additionally, the individual may use container cap 22 to  
13 illuminate medicinal product 30. This can serve as an  
14 additional check that the individual is consuming the correct  
15 medicine. The individual would perform this function by  
16 removing container cap 22 from container receptacle 28,  
17 retrieving medicinal product 30, placing it in his palm,  
18 between his fingers, or on a tabletop, and then using  
19 container cap 22 as described above, while removed from  
20 container receptacle 28 or attached thereto, to illuminate  
21 medicinal product 30.

22

1        FIGS. 10 through 15 illustrate a second embodiment of a  
2        medicine container, generally **100**, embodying a container cap,  
3        generally **102**. Medicine container **100** also includes a  
4        container receptacle **28** and a container label **32**, both  
5        preferably identical to those described in detail above.

6  
7        Container cap **102** is comprised of an annular supporting  
8        structure **144** having a cavity **148** into which is fitted a  
9        printed circuit board **120**. Thus, printed circuit board **120** is  
10       contained within container cap **102** and is preferably  
11       positioned perpendicular to the longitudinal axis of attached  
12       container receptacle **28**. Printed circuit board **120** is secured  
13       in cavity **148** to annular supporting structure **144**, preferably  
14       by adhesive **61**, such as AS-124M removable adhesive, available  
15       from Adhesives Research, Inc., although other securing methods  
16       may be used. Annular supporting structure **144** also contains an  
17       annular receiving ledge **116** to accept container cap insert  
18       cover **24**. Container cap insert cover **24** is connected to  
19       annular supporting structure **144** at annular receiving ledge  
20       **116** either by a frictional fit or by an adhesive, e.g.,  
21       silicone rubber. Container cap insert cover **24** also contains  
22       flexible membrane **46**, preferably identical to that described

1 in detail above, which makes direct contact with electrical  
2 switch 52, e.g., a Panasonic EVQ-PLDA15. Container cap 102  
3 also contains a plurality of annularly arranged openings 108  
4 from which a plurality of lightwaves 104 emerge. The  
5 lightwaves 104 are generated by a plurality of illuminating  
6 sources 128, e.g., a blue light emitting diode, such as a  
7 Lumex SSL-LX3044USBC, although other LEDs, emitting other  
8 colors, or incandescent bulbs, such as a Copeland retinoscope  
9 lamp bulb, may be used. Annular supporting structure 144 is  
10 preferably fabricated by molding an opaque plastic material,  
11 such as colored Acrylic or colored Lexan. Additionally,  
12 annular supporting structure 144 can be machined from plastic  
13 stock (e.g., cast Acrylic rod).

14  
15 Lightwaves 104 travel through a plurality of filter covers  
16 110 to create a plurality of light source beams 106, which  
17 illuminate container label 32. Similar to the preferred  
18 embodiment discussed above, filter covers 110 may be  
19 manufactured with different colors depending on the color of  
20 the LED used. For example, filter covers 110 can be made from  
21 a blue-colored material to produce a bluish illumination if  
22 illuminating source 128 is a white LED. In fact, there are a  
23 wide variety of LED/filter combinations that can be used to



1 create many light beams colors. Further, colored LED lens  
2 covers, e.g., a Chicago Miniature Lamp 434-6, can be used,  
3 which snap directly onto the LED itself, thus offering yet  
4 another method for achieving various illumination colors.  
5 Thus, there are a number of possibilities for creating various  
6 illumination colors. Filter covers 110 also provide  
7 environmental protection, e.g., waterproofing, for the  
8 internal components of container cap 102. Annular supporting  
9 structure 144 has a set of internal threads 64 for attachment  
10 to a set of external threads 66 in container receptacle 28.

11

12 Printed circuit board 120 contains energy source 56, e.g.,  
13 a Duracell D361, a variable current-limiting device 112, e.g.,  
14 a Bourns Series 3309P, a plurality of illuminating sources  
15 128, connected by a plurality of illuminating source leads  
16 124, and electrical switch 52, all connected by PCB circuit  
17 traces in order to implement the closed circuit shown in FIG.  
18 15. In the second embodiment four illuminating sources 128 are  
19 used, however, more or less illuminating sources 128 could be  
20 used to generate lightwaves 104. These circuit components can  
21 be inserted on printed circuit board 120 in an automated  
22 fashion (automatic insertion manufacturing typical to the  
23 electronics industry) or by manual methods. Alternatively,

1 the closed circuit can be implemented by soldering the  
2 components together directly, without the use of printed  
3 circuit board 120, and subsequently securing the components in  
4 cavity 148 by an encapsulating potting compound, e.g., EPOCAP  
5 14530A/2404B, available from Sanford Distributing Co., or a  
6 flexible adhesive, such as silicone rubber, e.g., Silastic®  
7 silicone rubber, available from Dow Corning.

8  
9 The second embodiment of the invention shown in FIGS. 10  
10 through 15 utilizes the same functional principles as those  
11 described in the preferred embodiment above, but operates in a  
12 slightly different manner. The individual holds medicine  
13 container 100 in such a way that at least one digit of the  
14 individual's hand, preferably the forefinger, rests on  
15 flexible membrane 46. While reading container label 32, the  
16 individual presses flexible membrane 46 thus directly  
17 contacting electrical switch 52. As switch 52 closes, an  
18 electrical current 152 flows from energy source 56 through  
19 variable current-limiting device 112 and divides into a  
20 plurality of smaller electrical currents 132. Each of smaller  
21 electrical currents 132 flow through respective illuminating  
22 sources 128, and eventually combine to return back to energy  
23 source 56. As smaller electrical currents 132 flow through

1 each illuminating source **128**, each illuminating source **128** is  
2 energized and lightwaves **104** are emitted and travel through  
3 filter covers **110** to form light source beams **106**. Variable  
4 current-limiting device **112** can be adjusted to vary the  
5 intensity of lightwaves **104**. Light source beams **106** overlap in  
6 such a way that container label **32** is illuminated in its  
7 entirety. The individual may then read container label **32** in a  
8 variety of ways as described above in the preferred  
9 embodiment.

10  
11 FIG. 16 illustrates a third embodiment of a medicine  
12 container, generally **200**, embodying a container cap, generally  
13 **204**. Medicine container **200** also includes a container  
14 receptacle **28** and a container label **32**, both preferably  
15 identical to those described in detail above. In this  
16 embodiment electrical switch **52** has been moved to the side of  
17 container cap **204** just beneath a side-mounted flexible  
18 membrane material **212** attached to a container cap side **214**. A  
19 container cap insert cover **208** is connected to container cap  
20 **204** either by a frictional fit or by an adhesive, e.g.,  
21 silicone rubber. Container cap **204** has internal structure,  
22 similar to that described in detail above, in order to enclose

1 and support the appropriate printed circuit board and  
2 components.

3

4 The third embodiment of the invention shown in FIG. 16  
5 utilizes the same functional principles as above, but operates  
6 in a slightly different manner. The individual holds medicine  
7 container 200 in such a way that at least one digit of his  
8 hand, preferably his thumb, rests on side-mounted flexible  
9 membrane 212. While reading container label 32, the individual  
10 presses flexible membrane 212 thus directly contacting  
11 electrical switch 52 just beneath. As electrical switch 52  
12 closes, electrical current flows from energy source 56 and  
13 energizes the LEDs as described above (either the single LED  
14 of the preferred embodiment or the plurality of LEDs of the  
15 second embodiment). The individual may then read container  
16 label 32 or inspect medicinal product 30 in a variety of ways  
17 as described above in the preferred embodiment.

18

19 FIG. 17 illustrates a fourth embodiment of the invention,  
20 which provides a different method for activating the switch  
21 mechanism. In this embodiment a flexible container cap insert  
22 cover 216, preferably constructed entirely from a thin plastic  
23 or rubber material, is used to make contact with electrical

1 switch 52 either directly, or indirectly through cylindrical  
2 adaptor 80. Flexible container cap insert cover 216 is  
3 connected to outer annular support rim 70 in the preferred  
4 embodiment, or to annular supporting structure 144 in the  
5 second embodiment, by a frictional fit (or by an adhesive,  
6 e.g., silicone rubber or AS-124M removable adhesive, available  
7 from Adhesives Research, Inc.).

8  
9 In the fourth embodiment shown in FIG. 17 the individual  
10 holds medicine container 20 in such a way that at least one  
11 digit of his hand, preferably his forefinger, rests on  
12 flexible container cap insert cover 216. While reading  
13 container label 32, the individual presses flexible container  
14 cap insert cover 216 thus contacting cylindrical adaptor 80,  
15 which in turn contacts electrical switch 52 (FIG. 2), or by  
16 directly contacting the switch when cap insert cover 216 is  
17 used in the second embodiment shown in FIG. 11. The individual  
18 may then read container label 32 or inspect medicinal product  
19 30 in a variety of ways as described above in the preferred  
20 embodiment.

21

22 FIG. 18 illustrates a fifth embodiment of the invention  
23 whereby illumination source 40 is energized using a monostable

1 multivibrator 310, e.g., a National Semiconductor LMC555CM,  
2 although other timer circuitry may be implemented. In this  
3 mode, a monostable pulse output 314, in the ON state,  
4 energizes illumination source 40. Illumination source 40  
5 remains energized for a preset period of time, T, generally  
6 318, thus ensuring that the LED is de-energized after a  
7 certain amount of time, further conserving energy source  
8 lifetime. Monostable multivibrator 310, illumination source  
9 40, energy source 56, and electrical switch 52 can all be  
10 mounted on a printed circuit board similar to that described  
11 in the preferred embodiment above. Monostable multivibrator  
12 310 can also energize illuminating sources 128 if used in the  
13 second embodiment described above.

14  
15 The fifth embodiment shown in FIG. 18 operates to conserve  
16 the energy contained in energy source 56, thus prolonging its  
17 lifetime. The multivibrator circuit shown operates in a  
18 monostable, or "one-shot," mode. When switch 52 is pressed  
19 then released, monostable multivibrator 310 outputs a preset  
20 timed pulse just long enough for the individual to read  
21 container label 32, e.g., 15-20 seconds, although other times  
22 may be programmed. Monostable pulse output 314 energizes  
23 illumination source 40 for preset period of time, T 318.

1 Energized illumination source **40** in turn illuminates container  
2 label **32** as described above. Once preset period of time, T  
3 **318** is complete, monostable pulse output **314** de-energizes  
4 illumination source **40** thus stopping a monostable pulse output  
5 electrical current flow **322** and conserving energy source **56**.  
6 The individual may energize illumination source **40** again by  
7 pressing then releasing switch **52**. This approach may also  
8 function with the second embodiment shown in FIGS. 10-15,  
9 whereby all four illuminating sources **128** would be energized  
10 by monostable pulse output **314**.

11

12 As described in FIG. 19, in a sixth embodiment, an astable  
13 multivibrator circuit **300**, e.g., a National Semiconductor  
14 LMC555CM, although other timer circuitry may be implemented,  
15 can be used to energize illumination source **40** by turning it  
16 ON and OFF very rapidly. This has the dual effect of reducing  
17 the current illumination source **40** draws while energized, thus  
18 prolonging energy source **56** lifetime, while also changing the  
19 brightness of illumination source **40** by varying the voltage  
20 supplied to illumination source **40**. Both of these features are  
21 accomplished by changing the duty cycle  $[T(\text{on}) / T(\text{off})]$  of  
22 periodic pulse train, generally **304**, output from astable

1 multivibrator circuit 300. The maximum brightness, and maximum  
2 electrical current drain from energy source 56, occur when  
3  $T(\text{on}) = T(\text{off})$ . Brightness and electrical current drain  
4 decrease as  $T(\text{on})$  decreases and  $T(\text{off})$  increases. Illumination  
5 will appear to be "ON" to the patient, e.g., not visibly  
6 flickering, as long as the frequency of the pulse train  
7 remains above approximately 60-Hz. Astable multivibrator  
8 circuit 300, illumination source 40, energy source 56, and  
9 electrical switch 52 can all be mounted on a printed circuit  
10 board similar to that described in the preferred embodiment  
11 above. Astable multivibrator circuit 300 can also energize  
12 illuminating sources 128 if used in the second embodiment  
13 described above.

14  
15 The sixth embodiment shown in FIG. 19 operates to further  
16 conserve the energy contained in energy source 56, thus  
17 prolonging its lifetime. The multivibrator circuit shown  
18 operates in an astable mode, or "free-running" mode. When  
19 switch 52 is pressed and held closed, astable multivibrator  
20 circuit 300 outputs preset periodic pulse train 304. Periodic  
21 pulse train 304 presents a high state [ $T(\text{off})$ ] and a low state  
22 [ $T(\text{on})$ ] as shown in FIG. 19. In this embodiment, a low state  
23 energizes illumination source 40 while a high state de-



1 energizes illumination source **40**. In such a configuration, the  
2 average voltage delivered to illumination source **40** depends on  
3 the duty cycle, with no power dissipation during the OFF  
4 periods [T(off)] (e.g., no energy source electrical current  
5 drain). Astable multivibrator circuit **300** can be used to  
6 deliver a duty cycle from 50% to 99%. By using the LOW period  
7 [T(on)] of periodic pulse train **304** to power illumination  
8 source **40**, and setting a 50% duty cycle [T(on) = T(off)] as  
9 the maximum brightness (and maximum energy source electrical  
10 current drain), one can control the illumination source **40**  
11 brightness and electrical current drain from virtually OFF  
12 (99% duty cycle) to a maximum ON (50% duty cycle). Periodic  
13 pulse train **304** of astable multivibrator circuit **300** energizes  
14 illumination source **40** with an astable output electrical  
15 current flow **326**, which in turn illuminates container label **32**  
16 as described before. This approach may also function with the  
17 second embodiment shown in FIGS. 10-15, whereby periodic pulse  
18 train **304** would energize all four illuminating sources **128**.

19

20 FIG. 20 illustrates a seventh embodiment which combines  
21 monostable multivibrator **310** with astable multivibrator  
22 circuit **300**. In this case a dual-timer integrated circuit,  
23 such as a National Semiconductor LM556CMXTR, may be used,

1 although other timer circuitry may be implemented. Monostable  
2 multivibrator 310, astable multivibrator circuit 300,  
3 illumination source 40, energy source 56, and electrical  
4 switch 52 can all be mounted on a printed circuit board  
5 similar to that described in the preferred embodiment above.  
6 Monostable multivibrator 310 and astable multivibrator circuit  
7 300 can also energize illuminating sources 128 if used in the  
8 second embodiment described above.

9

10 The seventh embodiment shown in FIG. 20 operates to  
11 further conserve the energy contained in energy source 56,  
12 thus prolonging its lifetime even further. When switch 52 is  
13 pressed then released, monostable multivibrator 310 outputs a  
14 preset timed pulse just long enough for the individual to read  
15 the container label 32, e.g., 15-20 seconds, although other  
16 times may be programmed. In this embodiment monostable pulse  
17 output 314 is used to activate astable multivibrator circuit  
18 300, which in turn energizes illumination source 40 with  
19 periodic pulse train 304 as described above. Energized  
20 illumination source 40 in turn illuminates container label 32  
21 as described before. Illumination source 40 is energized for  
22 preset period of time, T 318. Once preset period of time, T

1 318 is complete, monostable pulse output 314 de-activates  
2 astable multivibrator circuit 300 thus stopping astable output  
3 electrical current flow 326 and conserving energy source 56.  
4 The individual may energize illumination source 40 again by  
5 pressing then releasing switch 52. This approach may also  
6 function with the second embodiment shown in FIGS. 10-15,  
7 whereby periodic pulse train 304 would energize all four  
8 illuminating sources 128.

9

10 FIGS. 21 and 22 illustrate an eighth embodiment of the  
11 invention using a medicine container, generally 400, embodying  
12 a container cap, generally 404, a conventional container cap  
13 408, and container label 32 attached to container receptacle  
14 28, both preferably identical to those described in detail  
15 above. In this embodiment container cap 404 is removably  
16 coupled to conventional container cap 408. Container cap 404  
17 is similar to container caps 22, 102, 204 described above with  
18 respect to illumination and control of illumination, but the  
19 structure used for attachment to container receptacle 28 is  
20 adapted to allow container caps 22, 102, 204 to attach  
21 directly to conventional container caps 408, which are  
22 currently supplied with medicine containers. That is,

1 container cap 404 is removably connected to conventional  
2 container cap 408 at junction 416 by a frictional fit or by an  
3 adhesive, e.g., silicone rubber or AS-124M removable adhesive,  
4 available from Adhesives Research, Inc.

5

6 The eighth embodiment of the invention shown in FIGS. 21  
7 and 22 utilizes the same principle as above, but operates in a  
8 slightly different manner. In reading container label 32 and  
9 inspecting medicinal product 30 contained within container  
10 receptacle 28, the individual retrieves medicine container 400  
11 and then attaches container cap 404 directly to conventional  
12 container cap 408. The individual does so by initially  
13 aligning container cap 404 to conventional container cap 408,  
14 as shown in FIG 22, and then pushing container cap 404 until  
15 it is firmly seated on conventional container cap 408, as  
16 shown in FIG. 21. The individual may then read container label  
17 32 or inspect medicinal product 30 using light source beams,  
18 generally 412, in a variety of ways as preferably described in  
19 the above embodiments.

20

21 FIGS. 23 and 24 illustrate a ninth embodiment of the  
22 invention using a medicine container, generally 500, embodying  
23 an illumination base, generally 502, and container label 32

1 attached to container receptacle **28**, both preferably identical  
2 to those described in detail above. In this embodiment  
3 medicine container **500** is removably coupled to illumination  
4 base **502**. Illumination base **502** is larger than medicine  
5 container **500** and serves as a supporting base to hold medicine  
6 container **500** when medicine container **500** is inserted into an  
7 opening **506**, which contains a plurality of friction fingers  
8 **504** configured radially within illumination base **502**. Friction  
9 fingers **504** are formed from a moldable flexible material, such  
10 as silicone rubber, and serve to press against medicine  
11 container **500** (see Fig. 24B) therefore holding it in place  
12 when medicine container **500** is placed in illumination base  
13 **502**. Illumination of container label **32** occurs when a  
14 plurality of light source beams **512** are emitted from an  
15 annular output opening **508**. Light source beams **512** are  
16 generated as described above using either a single LED **522**  
17 with a light pipe channel **518**, preferably made from acrylic as  
18 described above, or with a plurality of LEDs (not shown)  
19 directed from illumination base **502** toward container label **32**.  
20 Additionally, other light sources could be used to generate  
21 light source beams **512**.

22

1       The ninth embodiment of the invention shown in FIGS. 23  
2 and 24 utilizes the same principle as above, but operates in a  
3 slightly different manner. In reading container label 32 and  
4 inspecting medicinal product 30 contained within container  
5 receptacle 28, the individual retrieves medicine container 500  
6 and then inserts it in opening 506 in illumination base 502  
7 through friction fingers 504. As medicine container 500  
8 contacts an electrical switch 516 within the base 502, just  
9 under friction fingers 504, LED 522 is energized and emits  
10 light source beams 512, which travel through light pipe  
11 channel 518 where they are directed to label 32. The  
12 individual may then read container label 32 or inspect  
13 medicinal product 30 using light source beams 512.

14

15       FIGS. 25 and 26 illustrate a tenth embodiment of the  
16 invention using a medicine container, generally 600, embodying  
17 an illumination base, generally 602, and container label 32  
18 attached to container receptacle 28, both preferably identical  
19 to those described in detail above. In this embodiment  
20 medicine container 600 is removably coupled to illumination  
21 base 602. Illumination base 602 further consists of a  
22 supporting base 620 and an enclosing container illumination

1 lightpipe 616, which is larger than medicine container 600 and  
2 aligns with an output aperture 608. Lightpipe 616 is  
3 preferably circular and made from acrylic, as described in the  
4 above embodiments. Lightpipe 616 could also be constructed in  
5 another shape, such as rectangular or square, as long as  
6 output opening 608 is of a similar configuration. Supporting  
7 base 620 serves as a supporting base to hold medicine  
8 container 600 when medicine container 600 is inserted into an  
9 opening 606, which contains a plurality of friction fingers  
10 604. Friction fingers 604 are formed from a flexible material,  
11 such as silicone rubber, and serve to press against medicine  
12 container 600 therefore holding it in place when medicine  
13 container 600 is placed in supporting base 620. Illumination  
14 of container label 32 occurs when a plurality of light source  
15 beams 612 are emitted from an annular output opening 608 and  
16 travel through lightpipe 616 to label 32. Light source beams  
17 612 are generated as described above using either a single LED  
18 with a light pipe channel (not shown), or with a plurality of  
19 LEDs (not shown) directed from supporting base 620 toward  
20 container label 32. Additionally, other light sources could be  
21 used to generate light source beams 612.

22

1       The tenth embodiment of the invention shown in FIGS. 25  
2 and 26 utilizes the same principle as above, but operates in a  
3 slightly different manner. In reading container label 32 and  
4 inspecting medicinal product 30 contained within container  
5 receptacle 28, the individual retrieves medicine container 600  
6 and then inserts it in enclosing container illumination  
7 lightpipe 616 until it engages friction fingers 604 within  
8 opening 606. As medicine container 600 contacts an electrical  
9 switch 516 (not shown) within the base 620, just under  
10 friction fingers 604, the LED is energized and emits light  
11 source beams 612, which travel through light pipe channel 616  
12 where they are directed to label 32. The individual may then  
13 read container label 32 or inspect medicinal product 30 using  
14 light source beams 612.

15

16       There have been described and illustrated herein  
17 embodiments of a self-contained illumination cap for medicine  
18 containers and methods for using the same. While particular  
19 embodiments of the invention have been described, it is not  
20 intended that the invention be limited thereto, as it is  
21 intended that the invention be as broad in scope as the art  
22 will allow and that the specification be read likewise. Thus,  
23 it is recognized that although the container cap is shown



1 connected to the medicine container receptacle by threads,  
2 thus signifying a typical, adult-type cap, with a screw-on,  
3 screw-off action, other types of connections will work as  
4 well. In particular, the container cap can be designed as a  
5 childproof or child resistant cap, e.g., those types that have  
6 to be further manipulated in some fashion before being  
7 removed; as an adult cap that simply snaps off or pulls off of  
8 the medicine container receptacle; or as a universal cap  
9 (e.g., such as one using o-rings to provide a frictional fit)  
10 that fits a wide variety of containers and/or conventional  
11 container caps. In other words, there are a number of  
12 attachment methods that may be implemented.

13

14 It is also recognized that although the light beams are  
15 created by an LED, other illumination sources may be used as  
16 well, such as incandescent bulbs, electroluminescent sources,  
17 or fluorescent sources, to name a few. Additionally, although  
18 the preferred embodiment shows only one LED centered in the  
19 container cap, more than one LED could be used to provide  
20 lightwaves to the light pipe channel. Also, although the  
21 second embodiment shows multiple LEDs used to illuminate the  
22 label (four LEDs shown) in a complete 360-degree range, the  
23 device can function with as few as one LED, that is, such

1 illumination can be less dispersed. In this case, the  
2 container cap can be rotated through 360-degrees to read a  
3 label that completely encompasses the container.

4

5 It is further recognized that although the preferred  
6 embodiments describe a current-limiting device, such as a  
7 resistor or potentiometer, to limit electrical current  
8 delivered from the energy source to the illumination source,  
9 other illumination sources with built-in current limiting  
10 capabilities may be used, thus negating the use for a discrete  
11 current-limiting device (e.g., such as an LED with an internal  
12 resistor). Additionally, the energy source and illumination  
13 source may be chosen in such a way that there is no need for a  
14 current-limiting device (e.g., the battery voltage is just  
15 enough to supply the voltage required by the illumination  
16 source).

17

18 It is even further recognized that although the preferred  
19 embodiment describes a light guide constructed using the  
20 material inherent to the cap, other types of light delivery  
21 devices may be used as well, such as individual optical fibers  
22 or individual light pipes (e.g., acrylic plastic or liquid)  
23 designed to fit within the container cap. Additionally,

1 although the light pipe channel of the preferred embodiment is  
2 shown with a flat entry surface, a curved entry surface can be  
3 constructed which acts to gather more light from the  
4 illumination source into the light pipe channel. Even further,  
5 a curved exit surface can be constructed which acts to focus  
6 more of the light to the label. Additionally, even though the  
7 annular filter cover is shown with a flat surface, a curved  
8 exit surface can be constructed which acts to focus more of  
9 the light to the label.

10

11 It is also understood that although the energy source is  
12 shown as a silver-oxide button cell, other battery-type energy  
13 sources may be used as well, such as mercury-oxide cells,  
14 lithium cells, lithium manganese dioxide, or zinc-air cells, to  
15 name a few. It is also conceivable that other sources of  
16 energy may be used to energize the LED. These include solar  
17 cells with some type of energy storage medium (such as a  
18 capacitor), fuel cells, or magneto-electric whereby energy is  
19 generated by motion and stored in some type of energy storage  
20 medium (e.g., a capacitor).

21

22 It is further understood that although the switch  
23 presented above to energize the illumination source is a

1 manufactured, packaged switch, discrete switches made from  
2 individual parts (such as separate metal spring strips  
3 attached to the printed circuit boards) could be used as well.  
4 Additionally, although metal contact switches are presented,  
5 other switching mechanisms, such as liquid mercury tilt  
6 switches could be used. Further, although the switch is shown  
7 directly beneath the LED in the above embodiments, it could be  
8 placed in another location on the PCB. Even further, the  
9 switch mechanism could be placed within the outer walls of the  
10 cap, such that the patient could squeeze the cap anywhere  
11 along its sides to energize the illumination sources (e.g., a  
12 pair of metal strips can be designed within a flexible cap  
13 wall such that when the wall is squeezed, an outside circular  
14 metal strip would contact an inner circular metal switch thus  
15 connecting the energy source to the illumination source). That  
16 is, there are a number of possible construction methods and  
17 locations of devices that can be used to energize the  
18 illumination sources.

19

20 It is even further recognized that there are additional  
21 circuits, both discrete and integrated (ICs), that can perform  
22 equivalently to the monostable and astable multivibrator  
23 functions, that is, to conserve energy source lifetime and

1 control LED brightness. Additionally, although surface mount  
2 components are described in the above embodiments, it is noted  
3 that more traditional, non-surface mount devices may be used  
4 as well.

5  
6 It is even further understood, that although the current  
7 embodiments are shown with a flat flexible membrane, a raised  
8 or curved membrane could also be used. Additionally, although  
9 shown with a smooth surface, the top surface of the flexible  
10 membrane can also be manufactured with texture, such as raised  
11 lines or a raised cross-hatched pattern, providing further  
12 ease in using the device in low-light conditions.

13  
14 It is additionally recognized that although the  
15 illumination base of the ninth and tenth embodiments is shown  
16 with a square shape, other shapes, such as circular, oval,  
17 rectangular, hexagonal, etc. could be utilized as well. Even  
18 further, although the opening that accepts the medicine  
19 container is shown as being circular, it could also be of a  
20 variety of shapes, such as oval, square, rectangular,  
21 hexagonal, etc. That is, there are a number of variations for  
22 the base construction with respect to its shape and opening.  
23 Additionally, although radial friction fingers, which hold the

1 medicine container in the base, are shown, other  
2 configurations of friction fingers could be used, such as a  
3 plurality of fingers arranged in a parallel fashion to each  
4 other. It is also recognized that although only one opening  
5 is shown in the illumination base, there could be a plurality  
6 of openings with accompanying illumination means for each,  
7 such that a number of containers could be viewed  
8 simultaneously. Further, although an internal electrical  
9 switch is shown and used to energize the illumination sources,  
10 it is recognized that an external switch, mounted on the top  
11 surface or side surface of the illumination base, may also be  
12 used to energize the illumination sources. Even further,  
13 although an electrical switch is shown, it is recognized that  
14 an electro-optical switch mechanism could be implemented such  
15 that when the container is inserted in one of the illumination  
16 base openings, the container body interacts with the electro-  
17 optical switch such that the illumination sources are  
18 energized.

19

20 It will also be appreciated by those skilled in the art  
21 that yet other modifications could be made to the provided  
22 invention without deviating from its spirit and scope as  
23 claimed. As such, those skilled in the art will appreciate

1 that the conception, upon which this disclosure is based, may  
2 readily be utilized as a basis for the designing of other  
3 structures, methods and systems carrying out the several  
4 purposes of the present invention. It is important,  
5 therefore, that the claims be regarded as including such  
6 equivalent construction insofar as they do not depart from the  
7 spirit and scope of the present invention.

8